Incremental Model
Rapid Application Development(RAD)

Software Engineering I

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Incremental Model

- The Incremental Model is evolution of waterfall model.
- Rather than deliver the system as a single delivery, the development and delivery is broken down into increments with each increment delivering part of the required functionality.
- User requirements are prioritised and the highest priority requirements are included in early increments (core product).

For example, word-processing software developed using the incremental model might deliver basic file management, editing, and document production functions in the first increment; more sophisticated editing and document production capabilities in the second increment; spelling and grammar checking in the third increment; and advanced page layout capability in the fourth increment

Incremental development advantages

•Incremental development is particularly useful when staffing is unavailable for a complete implementation by deadline that has been established for the project.
Early increments can be implemented with fewer people. If the core product is well received, then additional staff (if required) can be added to implement the next increment.
•Customer do not have to wait until the entire system is delivered
•Lower risk of overall project failure.
•Customer can respond to each built.
•It handles large projects.

Disadvantages

•It requires the well defined project planning schedule to distribute the work properly

•Product is delivered in parts so the total development cost is higher.

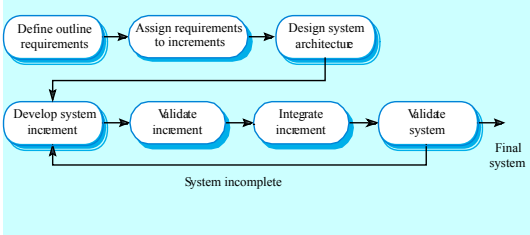
When to USE

•Requirements of the complete system are clearly defined and understood.

•Major requirements must be defined; however, some details can evolve with time.

•There is a need to get a product to the market early.

Incremental development



Rapid Application Development

- Rapid application development (RAD) is an incremental software development process model that emphasizes an extremely short development cycle.
- The RAD model is a "high-speed" adaptation of the linear sequential model.
- If requirements are well understood and project scope is constrained, the RAD process enables a development team to create a "fully functional system" within very short time periods(60-90 days).

- The RAD approach encompasses the following phases

  Business modeling:
- The information flow among business functions is modeled in a way that answers the following questions:
  - What information drives the business process?
  - What information is generated?
  - Who generates it?
  - Where does the information go?
  - Who processes it?

Data modeling:

- The information flow defined in business modeling phase is refined into a set of data objects that are needed to support the business.
- Characteristics (called attributes) of each object are identified and the relationships between these objects defined.

Process modeling.

- The data objects defined in the data modeling phase are transformed to achieve the information flow necessary to implement a business function.
- Processing descriptions are created for adding, modifying, deleting, or retrieving a data object.

- **Application generation.**
- Automated tools are used to facilitate construction of the software.
- Reuse existing program components (when possible) or create reusable components.
- **Testing**
- Since the RAD process emphasizes reuse, many of the program components have already been tested. This reduces overall testing time.
- However, new components must be tested and all interfaces must be fully exercised.

Advantages

- RAD realizes an overall reduction in project risk
- More flexible – less costly to change scope and requirements.
- RAD uses short development cycles so users see the RAD product quickly.
- Flexible and adaptable to changes

Disadvantages

- For large but scalable projects, RAD requires sufficient human resources.
- RAD requires strong commitment from developers and customers in much abbreviated time frame
- RAD is not appropriate when technical risks are high.
- Needs a clear and complete definition of the whole system before it can be broken down and built incrementally.